

Space News Roundup

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No. 25



Astronaut S. David Griggs leans on the nose lightning rod of a T-38 trainer at Ellington Field. NASA photo

Astronaut dies in air crash

Services honor pilot scheduled to fly STS-33

Astronaut S. David Griggs was buried Wednesday at Arlington National Cemetery, with fellow astronauts and co-workers in attendance.

Griggs, described by many as a "pilot's pilot," was killed Saturday when the World War II-era trainer he was flying crashed near Earle, Ark. He had logged more than 9,500 hours of flying time, and flown more than 45 different types of aircraft.

The crash is being investigated by the Federal Aviation Administration and the National Transportation

Safety Board. Astronaut Bryan O'Connor, former head of the NASA Flight Safety Panel, and David Mumme, head of JSC's Pilot Section at Ellington Field, visited the crash site as part of an informal NASA inquiry.

More than 75 people from JSC, including Deputy Director P.J. Weitz and most of Griggs crew mates from STS-51D, attended the burial ceremonies. NASA Acting Administrator Richard H. Truly attended, and his wife, Cody, served as Navy Arlington Lady representing the Naval com-

mand. Sen. Jake Garn also attended, as did other representatives from NASA Headquarters, Marshall Space Flight Center and Kennedy Space Center.

The service included a flyby of four Navy A-4 aircraft, with the lead plane performing the pull-off because of Griggs' rank of Rear Admiral. The procession to the gravesite was led by a horse-drawn caisson, a Navy honor guard and band, and accompanied by the firing of 11 minute guns.

Please see **GRIGGS**, Page 4

Space outlook really 'uplook,' Truly reports

NASA Acting Administrator Richard H. Truly called on participants at Tuesday's National Space Outlook Conference to help NASA build a "golden age of unlimited progress."

Truly also told the group gathered at Tyson's Corner, Va., that 1990 will be a crucial year for NASA, and especially for Space Station *Freedom*.

"I say that the outlook is an uplook," Truly said. "NASA is poising itself to rise to greatness again. Working together, with the will to achieve and a sustained national commitment, we can move forward ... with all who share our values and our goals and want to join us, to build a golden age of unlimited progress in space and here on Earth for all mankind."

The space station represents a commitment to the country's future in space, a vital link that joins the present to the future, he said, noting that budget economies of the past may well have spelled false economies for the country's space program.

"If we are ever to put the meat on the bones of a definitive design, as planned, we will require not only an adequate budget, but a stable budget as well," he said. "I am committed to continuing the fight for such a budget, and to completing Space Station *Freedom* within it and on time!"

Truly added, however, that he is also committed to maintaining a balanced NASA program that includes development of an Advanced Solid Rocket Motor and advanced "pathfinder" technologies, support for a revitalized

expendable launch vehicle program with growing private sector involvement and expanded commercialization of space.

"The manned space programs will be funded, but not at the undue expense of our important space science programs and other critical NASA priorities," he said.

Truly said NASA is in "fine shape" today, and is stronger and better than ever. The agency's most important agenda item is keeping the space shuttle fleet flying safely at a sustainable and reasonable flight rate. He noted that the new mixed fleet manifest calls for four more flights this year, nine flights in 1990 and a gradual build-up to "a dozen or so" each year in the following years.

Truly took exception to critics of the agency's dealings with the private sector. "Since its inception, NASA has been bending over backward to move the private sector into space and to further the goal of space commerce," he said. "I can't agree with those who say we've been dragging our feet."

As the conference was taking place, members of the Senate Commerce, Science and Transportation Committee approved the nominations of Truly for NASA administrator, and J.R. Thompson for deputy administrator. The nominations next will be considered by the full Senate.

The committee also approved NASA's fiscal 1990 \$13.274 billion authorization request and added about \$100 million.



Richard H. Truly

Troublesome turbopump leaks sealed on *Columbia*

After successfully replacing a troublesome seal in one of the Space Shuttle *Columbia*'s high pressure fuel turbopumps twice, technicians at Kennedy Space Center finally were able to install heat shields around the engine Wednesday.

After an early June replacement of the turbopump because of an internal leak, technicians had to remove and reinstall the replacement pump on main engine number one three times due to leaks between the main combustion chamber and the turbopump.

Then, on Monday, yet another leak was discovered in a bearing cap on the turbopump. Technicians were able to correct that problem

Tuesday and install the heat shields Wednesday.

Columbia's target date for towing from the Orbiter Processing Facility to the Vehicle Assembly Building remains no earlier than June 30. Once in the VAB, the orbiter will be mated to its external tank and solid rocket boosters. Launch is scheduled for July 31.

Also Wednesday, technicians began inspections of the aft bulkhead in preparation for closing the payload bay doors. Half of the payload bay has been closed out for flight and

technicians were scheduled to complete liner installation in the remaining bays Wednesday. The doors are scheduled to be closed this weekend.

Landing gear functional tests were completed late last week, and some cycle tests of the orbiter's payload bay doors to check the fit of associated thermal insulation were conducted in parallel. Many of the thermal insulation blankets have been installed within the payload bay and preparations are under way for final bay cleaning.

Orbiter brake tests were run without any significant problems. The orbiter's Ku-band communications system was tested during powered-up operations and midbody work continues as part of orbiter close out operations. Tile cavities stand at fewer than 25 with most on the payload bay doors. Those cannot be repaired until the doors are closed following completion of the cycle checks of the doors.

Inspection of the orbiter's radiators also was under way this week. Results of the functional tests and calibration of the inertial measurement units are being analyzed. Structural leak checks of the orbital maneuvering system pods continued Wednesday.



Epic journey 'comes together'

Anniversary briefing to recreate Apollo planning session

By James Hartsfield

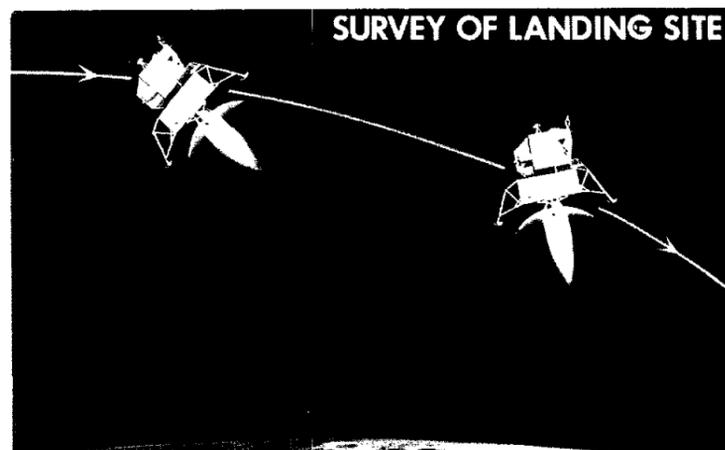
In 1966, there wasn't a Ford Mustang more than two years old; the Manned Spacecraft Center's future namesake was in the White House; the Vietnam War and the Beatles both were making news; and, in an auditorium here that summer, plans for mankind's first step on another world were beginning to gel.

The Apollo Lunar Landing Mission Symposium, held in June 1966 in what is now Teague Auditorium, brought together the plans that would become Apollo 11. For the first time, many participants saw the mission as a whole, rather than in the bits and pieces they or others were at work on throughout the country. Presentations were given on landing dynamics, propulsion systems, computer software and hardware,

landing site selection, communications, thermal constraints, guidance systems and other areas in work for the upcoming flight. It was a meeting like none held before and like none that have followed.

But at 11 a.m. July 18, various speakers will attempt to recreate that meeting, turning Teague Auditorium into a time capsule in the second of a week-long series of briefings by Apollo veterans planned as part of Apollo 11's 20th anniversary. Speakers will present shortened, 15-minute versions of each area discussed at the original symposium, and each presentation will be followed by an opportunity for the audience to ask questions, said JSC Assistant Director for Plans Joe Loftus, organizer of the briefing.

Please see **APOLLO 11**, Page 4



One of the charts used in the June 1966 meeting that brought together many of the Apollo 11 plans shows an artist's concept of the Lunar Module surveying a landing. NASA Photo

JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m. to 2 p.m. weekdays: FBA cards are still available to civil service employees at Bldg. 11 store. FBA Scholarship applications are now available in Building 1 room 840 for FBA members.

General Cinema (valid for one year): \$3.50 each.
 AMC Theater (valid until May 1990): \$3 each.
 Sea-Arama Marineworld (Galveston): adults, \$8.75; children \$5.50.
 Sea World (San Antonio): adults, \$17.25; children \$14.75.
 Palm Beach at Moody Gardens: adults \$2.75; children \$1.50.
 Astroworld (valid 1989): adults, \$14.12; children under 4, \$11.99; season pass, \$32.36;
 Waterworld (valid 1989): \$8.15.
 Six Flags (valid 1989): \$14.12.
 River Raft Trip (July 15, tickets go on sale June 12): \$30.
 Overnight River Raft Trip (July 15-16): \$72.
 Las Vegas Trip (August 17-20, call for reservations): credit, \$280; cash, \$275.
 Cruise Review Party (July 6-Gilruth Center Rm. 216, 5-7 p.m.; Cruise scheduled for Nov. 4-11 on Superliner): Approximately \$1160, including airfare; \$200 deposit to hold reservations.
 Splashdown Party (4:30-8:30 p.m. July 20 at the Gilruth Center): \$3. Tickets may be purchased from coordinators listed on JSC Announcement 89-112.

JSC

Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. To enroll, you must sign up in person at the Gilruth. Everyone will be required to show badge or EAA membership card. Payment must be made in full at the time of registration. Classes tend to fill up four weeks in advance.

EAA badges—Dependents and spouses may apply for a picture I.D. 6:30-9:30 p.m. Monday-Friday.

Defensive driving—Course is offered from 8 a.m.-5 p.m., August 12; cost is \$22.

Weight safety—Required for use of the Rec Center weight room. Classes will be 8-9:30 p.m., June 29, July 12, and July 27; cost is \$4.

Aerobics and exercise—Both classes are ongoing; cost is \$24.

Tennis lessons—Beginning tennis, Mondays 5:15-6:45 p.m. Six week course begins June 26; \$32 per person.

Scuba lessons—The course includes classroom and pool sessions, open water dive. Five-week class begins July 10; cost is \$45, plus additional fees.

"Moonwalk" tournament—Men's open "c" softball tournament is July 8 and 9. Cost is \$95. Entry deadline is July 6 at 5:30 p.m.

JSC

Swap Shop

Swap Shop ads are accepted from current and retired NASA civil service employees and on-site contractor employees. Each ad must be submitted on a separate full-sized, revised JSC Form 1452. Deadline is 5 p.m. every Friday, two weeks before the desired date of publication. Send ads to Roundup Swap Shop, Code AP3, or deliver them to the deposit box outside Rm. 147 in Bldg. 2.

Property

Sale: Seabrook, 3-2-5-2, 1,800 sq. ft., family room, garden window, secluded neighborhood, assume 9 1/2% VA, \$86,400 plus equity. 326-3213.

Lease: Pearl and, 3-2-5-2, FPL, den, both formals, 1,800 sq. ft., good schools, 1 yr. lease min., \$695/mo. plus dep. 997-2737.

Lease: 5 min. from NASA, charming 3-2 cottage, freshly renovated, light and bright, CH, A/C, dishwasher, fenced yd., shade trees. 728-5693.

Rent: League City, 3-2-2, FPL, nice neighborhood, \$750/mo., incl. lawn care. 554-6200.

Sale: Friendswood/Sun Meadow Estates, wooded lot in estab. neighborhood, cul-de-sac, bordered by stream and golf course on 2 sides, approx. 245' deep and up to 86' wide, util. on site, \$29,500. Doug, x32860 or 486-7412.

Sale: 1 BR condo (Pebblebrook), owner fin., new A/C unit, new dishwasher, W/D, vaulted ceiling w/fan, pool, tennis, priv. entrance, loan bal., \$23,600. 280-1989 or (409) 925-8593.

Sale: Prime Galv. Bay waterfront home, 3-3-6—car gar., deck, spa plus extras. 334-1909. Sale: Taylor Lake Estates, new 5-3-5-3, study, gameroom on lg. lot, \$278,500. Don, x38039 or 333-3313.

Lease: Condo, 1 min. from JSC Saturn gate, 1 BR, W/D, \$315/mo. 480-3535.

Rent: Heritage Park, 4-2-2, FPL, close to elem. and high school. Shirley, x33574 or 482-4563.

Rent: Lake Livingston, waterfront, 3-2, fully furn., new cond., covered decks, priv, sleeps 6, ex. fishing, swimming, skiing. 482-1582.

Sale: Middlebrook, contemp., 3-2-2, great room w/spiral staircase to loft, FPL, vaulted ceilings, open, light, heated pool and spa, 2,052 sq. ft. 480-8606.

Sale: Middlebrook, 3-2-2, well-maintained, many updates, new paper, paint, assum., \$79,700. x32805 or 486-1888.

Sale: Waterfront property, Seabrook, on sm. bay and across the street from Galveston Bay, lg., 100' x 125', perfect for a summer or year round homesite. 474-5558.

Rent: Nice 2-1 apt., Webster/Clear Lake area, many extras. Dave, x38156 or 486-5181 or Eric, x38420.

Lease: Heritage Park, new sec., cathedral ceiling, FPL, sep. dining room, pass-through bar, lg. walk-in closets, fenced, gar. opener, \$575/mo. 482-6609.

Rent: Cancun, MX., 2 BR villa, 5-star resort, sleeps 6, satellite T.V., fully equipped kitchen, maid serv., and rec. amenities incl., \$135/night. 729-0654.

Rent: Lake Travis cabin, priv. boat, dock, CA/H, fully equipped, \$300/\$425 weekly. 326-5652.

Rent: League City, Pecan Forest, 3-2-2, open plan, FPL, \$750/mo., incl. lawn care. 554-6200.

Sale: Alvin area, 3-1-1, 25 min. from NASA, cul-de-sac, well estab. neighborhood, 2 blks. from high school, great price. Kay, 331-3379.

Cars & Trucks

'80 Plymouth Volare, great cond., ex. int., one-owner, AM/FM/cass. stereo, A/C, V-6, \$1,800. Gary Evans, 996-9943.

'85 Pontiac 6000 LE, V-6, PS/PB, auto. trans., cruise, tilt wheel, gauges, low mi., \$5,500. Matt,

x34285 or 486-7260.

'77 Ford T-Bird, good ole work car, eng. runs great, \$1,000. OBO. Billie, 482-4365.

'76 Dodge Power Ram 4x4, very good running and driving cond., new clutch, new brakes, power wheel, \$3,000. George, 944-9761.

'76 Plymouth Arrow hatchback, AC/auto., good work car, \$600 cash, OBO. x34270 or 337-2682.

'65 VW Karmen Ghia, 1.8L race eng. w/race exhaust, Pioneer stereo, Fiero seats, custom int., orig. chrome ext., orig. owner, 1,300 mi. on new eng., \$4,200 neg. 488-5496.

'86 Pontiac Firebird, bright blue, T-tops, alarm w/kill switch, low mi., super cond., \$7,500. 538-1726.

'88 Ford F150 Supercab, 6 cyl., 5-spd., O/D trans., well-equipped, ex. cond., \$9,900. 944-5624.

'87 Toyota Supra, white, ex. cond., 5-yr. unlimited mi. warr. 333-2751.

Home-built VW rail dune buggy, eng. does not run, extra eng. parts, \$75. Nandin, x39408 or 480-7136.

'80-Camaro, V-8, auto., air, AM/FM/cass., PS, PB, good tires. David, 332-3072.

'85 Chevy van, maroon/white, fully customiz., AM/FM/cass., rear air, 4 Captain's chairs, backseat makes into bed. Judy, x39138 or 482-1850.

'88 Mazda 323 SE coupe, blue, ex. cond., 25K mi., 5-spd., AM/FM tape, A/C, \$6,400. Jay, 335-7134 or 481-2335.

'83 Nissan Sentra, 2-dr., ex. cond., 65k mi., cloth seats, sunfire red, grey int., \$3,000. Mike, x34535 or 554-6960.

'77 Buick LeSabre sports coupe Landau, 350 V-8 w/4 bbl. carb., 4 mags, new fuel pump, starter, rear brake cylinders, motor mounts and belts, eng. tuned up in April along w/tranny serv., \$775. OBO. 339-1337.

'83 Camaro, V-6, auto., PS, PB, A/C, AM/FM/cass., good cond., \$2,900. Keith, x34484 or 488-6315.

'78 3/4-ton Ford PU w/460 eng. big tires, blue and white, runs good, ex. for heavy duty usage, and work truck, \$1,800. 333-6064.

'80 El Camino, burns some oil, fair cond., \$800. OBO. 480-7695 or 280-9693.

'78 Cadillac Seville 350 fuel injection, all power, good cond., \$3,500. x34323 or 481-8545.

'87 Monte Carlo SS, V-8, 14K mi., auto., loaded, ex. cond., pampered, \$11,500. OBO. 480-4101 x254 or 470-1858.

'85 Toyota Corolla SR5, red, 2-dr., loaded, ex. cond., like new, must sell, \$5,400. 280-3538 or (409) 938-7570.

'81 Pontiac LeMans, needs some work, \$950. OBO. Terri, x39540 or 941-2928.

'84 Honda Civic, 4-dr., air, 5-spd., 66K, ex. cond., \$3,900. Jeff, x32997 or 532-1991.

Boats & Planes

'85 Bass Tracker II boat, 16', 35hp Mercury OB, trolling motor, livewell, bimini top, depth finder, \$2,400. Matt, x34285 or 486-7260.

'78 16' Cajun bass boat, 70hp Evinr., PT/T, new batteries full inst., 2-yr-old trailer, ex. cond. Larry, x39421 or 484-4397.

'81 Galaxy 17' Bowrider, 120hp OMC I/O, galv. trailer, ex. cond., gar. kept, \$4,300. 538-1221.

14' sailboat w/trailer, sloop rig w/sails, very wide beam, easy to sail, very lg. cockpit, \$500 cash. Alma, x36556 or Mike, 559-2450.

15' tri-hull Gemcraft boat w/80hp Johnson and trailer, walk-thru front, new paint, upper eng. unit tuned up in April, lower end rebuilt at the same time, no water time, \$1,150. OBO. 339-1337.

Today

Cafeteria menu—Special: tuna and noodle casserole. Entrees: broiled codfish, fried shrimp, baked ham. Soup: seafood gumbo. Vegetables: corn, turnip greens, stewed tomatoes.

June 24

Amateur radio field day—The American Radio Relay League (ARRL) will sponsor a field day June 24 and 25 at the Gilruth Recreation Center. This year's event is run as a contest with the object to make as many emergency "contacts" as possible in 24 hours. Contact John C. Gafford, 554-7776, for more information.

Monday

Aldrin autographs—Former Gemini/Apollo Astronaut Buzz Aldrin will be signing copies of his book *Men From Earth* from noon to 1 p.m. June 26 at Jeremy's Bookshelf, 2441 Bay Area Blvd. in Clear Lake. Contact Sally Jordan, 486-8028, for more information.

Pressure systems week—Pressure Systems week is June 26 through June 30. This year's theme is "The Pressure Around Us". The program will consist of a film titled "Explosion Danger Lurks" and a short presentation on the safe handling of propane tanks. Call O.T. Lewis, x35710, for the locations and times.

Cafeteria menu—Special: meatballs and spaghetti. Entrees: weiners and beans, round steak with hash browns. Soup: chicken noodle. Veget-

ables: okra and tomatoes, carrots, whipped potatoes.

Tuesday

Occidental road relay—The Occidental 4-by-2 mile corporate road relay will be held June 27 at the San Jacinto monument. There are male, female, and mixed team categories. NASA runners interested in participating should contact Patrick Chimes, x32397, for information; Air Force personnel can sign up with Luis Rodriguez, x38669.

BAPCO meeting—The Bay Area PC Organization (BAPCO) will meet at 7:30 p.m. June 27 at the League City Bank and Trust. Contact Earl Rubenstein, x34807 or 326-2354, or Ron Waldbillig, 337-5074, for information.

Cafeteria menu—Special: fried chicken. Entrees: beef stew, shrimp creole, sweet and sour pork chop with fried rice. Soup: beef and barley. Vegetables: stewed tomatoes, mixed vegetables, broccoli.

Wednesday

NMA to meet—The NASA/JSC Chapter of the National Management Association (NMA) will have the annual Awards Night at 5 p.m. on June 28 at the Gilruth Center ballroom. Dr. Malcolm Brown from the University of Texas will speak, and the new officers for the next NMA calendar year will be sworn in. Non-members should contact Ann Hammond at x32933. For more information, contact Gerald

Chapman at x34848.

Cafeteria menu—Special: Swiss steak. Entrees: fried perch, New England dinner. Soup: seafood gumbo. Vegetables: Italian green beans, cabbage, carrots.

Thursday

Cafeteria menu—Special: stuffed bell pepper. Entrees: turkey and dressing, enchiladas with chili, weiners and baked beans. Soup: cream of chicken. Vegetables: zucchini squash, English peas, rice.

June 30

Cafeteria menu—Special: Salisbury steak. Entrees: baked scrod, 1/4 broiled chicken with peach half. Soup: seafood gumbo. Vegetables: cauliflower Au Gratin, mixed vegetables, buttered cabbage, whipped potatoes.

Fall 1989

Aerospace Perspectives Course—A seminar entitled *Aerospace Perspectives*, HIST 5931, will be offered at the University of Houston-Clear Lake this fall. The course will take a non-technical but comprehensive look at the impact of aviation and space flight on modern society. The seminar will include brief lectures, with emphasis on class discussion and class reports. Each student will be required to complete a 20-25 page research paper. For more information, contact Roger Bilstein, 488-9678.

JSC

Swap Shop

15' V-hull fiberglass boat, closed bow, Sportsman galv. trailer, no motor, \$275. 339-1957.

'75 Bayliner 21' w/cuddy, new V-6 Crusader 165hp, can sleep 4, sink, toilet, ice box, holds 54 gal. of fuel, will trade for camper trailer or \$4,900 cash. George, 944-9761.

Mirage ultra light, 3x control, 50mph cruise, 9-1 glide, double surface wings, elect. start plus 5 1/2g-2.8g, \$3,000. OBO. Frank Kowis, x37850 or 477-6178.

Fiberglass rowing dinghy, midnight blue hull, white int., varnished teak gunwale, bronze oar locks, workable storage, like new, \$375. 334-3320.

Cycles
 24" men's Huffly 1-spd. bicycle, \$45. OBO. Bob, 280-1599.

'87 Honda 250R, ATV, low hrs., addit. performance parts, ex. cond., \$1,500. 538-2072.

3-wheel bike w/basket on back, in good shape, \$150. Margie, (409) 925-7529.

26" Nishiki Century men's bike, ex. cond., less than 1 yr. old, cost, \$225, sell \$150. 944-5624.

'80 CB 750 custom Honda, good cond., \$1,050 cash; '72 Honda 450, needs minor repairs, \$375 cash. x34270 or 337-2682.

1000 Goldwing motorcycle, low mi., CB/AM/FM stereo, black on black, \$1,295. OBO. 282-1727 or (409) 273-4098.

Honda 650 Turbo, low mi., new tires, new batt. 334-1909.

'86 Honda Interceptor VFR, gear driven cam V-4, like new, beautiful, red, white, blue, gar. kept, 1,300 mi. x31588 or 488-1326.

'89 Raleigh Technium bicycle, used once, incl. water bottles/cage, cost new \$350, asking \$150. Pam or David, 488-4207.

'86 Honda Elite 150 scooter, one owner, good cond., only 1,500 mi., \$800. David, x37056 or 486-9751.

Audiovisual & Computers

Commodore 64 computer w/disk drive, printer, manuals, software, \$225. Harold, x37494 or 484-3925.

Turbo-XT, 15" high res. w/Hercules graphics, 32 Meg., 28 MS, Segate HD, suitable for CAD-CAM, \$895. 486-1812.

Casio FX-195P pocket computer, 16K, built-in util. for complex numbers, integration, matrices and numerical solutions, incl. cass. interface, printer and SB-42 interface pack, \$110. Radio Shack EC-319 (Casio SF-4000) digital diary/phone directory, 32K memory, \$55. Tom Clark, 483-9842.

NEC Multimedia laptop computer, 9.54/4.77 MHz, 640Kb RAM, 2 720 Kb floppy disk drives, built-in pop-up firmware, incl. built-in 1,200 baud Hayes compatible modem, ext. transfer cable kit, carrying case, \$750. David, x37056 or 486-9751.

Household
 Glass table w/4 chairs, ex. cond., \$150. Kay, 331-3379.

Solid wood BR furn., bed, boxsprings, matt, dresser and mirror, chest of drawers, ex. cond., \$400. Matt, x34285 or 486-7260.

3pc. BR, incl. bedframe, chest of drawers, vanity w/lg. circular mirror, dark wood veneer, \$300. Michael, x35795 or 480-4856.

Whirlpool 16 cu ft. frost-free refrig., ice maker, almond, runs great, \$150. OBO. Karen, x34284.

Sofa/sleeper, brown, Naugahyde, \$100. OBO. x34541 or 482-7204.

RCA color T.V., 25" screen, remote control, ex. cond., 6 mos. old, \$395. Rod, 332-4896 or 554-4551.

Sofa and love seat, dusty gold pattern, sturdy,

very comfortable, ex. cond., \$350. OBO. Connie, x33264.

French Provincial, single bed, vanity, end table, chest of drawers, desk w/hutch, perfect for young teenager or little girl's room, \$375. B. Reina, x31588 or 488-1326.

Ward's 18 cu. ft. refrig., almond, ex. cond., \$200. OBO. 482-7397.

China cabinet, campaign style, pecan finish, lighted, like new, \$250. Norris Taylor, 474-9292.

Photographic
 Nikkor AF 50mm, F/1.8, new w/polarizing and UV-haze filters, \$50. 334-1934.

Pentax ME super 35mm camera w/50, 70-210 zoom lens and carry bag, \$200. OBO. Debbie, 534-4741.

Pets & Livestock

German Shepherds, AKC reg. 2 females born Easter day, one pure blk. and one blk. and tan w/dash of silver, \$125. 482-4365.

Rabbits, \$10/ea., incl. feed and instructions. 554-6200.

Chow Chow puppies, full-blooded, blk., wrinkled faces, M&F, born 5-5, \$125. x37815 or 475-2357.

Free cat, name: Scoundrel, blk., short hair, neutered, house-broken, 3 yrs. old, good temperament, affectionate. 481-6945.

Yellow Lab., male, 21 mo. old, free to good home. 482-3824 or 333-6564.

AKC white toy poodle, male, \$100. Debbie, 534-4741.

AKC Dachshund, female, blk. and tan, \$50. Debbie, 534-4741.

White toy poodles, AKC reg., ready 7-12-89, coupons for 1st vet exam free. Debbie, 534-4741.

Wanted
 Want '88-'89 Toyota Tercell or '88-'89 Nissan Sentra, must have good records, tires, mi., int., w/A/C, AM/FM stereo w/cass., royal blue or burgundy. Elaine, 733-6107.

College students want to rent a 3 plus BR house in the Rice/Medical Center/W. University area starting in Aug. Martha, x35111 or 488-4026.

Have a house or extra room for rent? If so, please contact the Co-Op Housing Committee at x34114, ask for Tony or Scott, x30633.

Want to join or form carpool from the Montrose/Rice area, will consider other Houston carpools also. Mary, x37249 or 528-7546.

Want chest type freezer, working, just about any size, will pay up to \$150. 339-1337.

Want vocalist for the Contraband Swing Band, 20-pc., big band performing around Houston area. Milt Hellin, 488-5903.

Unwanted items, everything from property to vehicles, electronics to appli., furn. to lawnmowers, I'll even buy whole gar. full, attic full or house full of items. Cotton, 474-5558 or Pepper, 339-1337.

Musical Instruments

Ibanez Pro-Line elec. guitar w/programmable pick-ups, hard case, 35 watt practice amp, Sholtz Rockman X100 w/effects, \$700. Richard, 282-3398 or 480-0524.

Kawai elec. organ, dual keyboard, rollout cover, solid oak, ex. cond., \$1,500. 332-9585.

Miscellaneous

Rotary lawnmower, 21" self-propelled, rear bagging, ex. cond., \$200. OBO.; weedeater, \$15. Bob, 280-1599.

Rabbit fur jacket, junior, lg., reddish brown, \$50. OBO. Karen, x34284.

NI-CAD battery packs for R/C cars, 7.2 volt

sub-C flat packs, 1200 MAH, new in package, \$15. Dennis, x39012.

350 Chevy eng., out of '76 P/U, \$150. Dennis, x39012.

Dining table, 6 chairs, \$600; couch,

MIXED FLEET MANIFEST

Space Shuttle

Flight	Date/ Orbiter	Inclination/ Altitude	Crew/ Duration	Primary Payload	Carrier
28	7/31/89 <i>Columbia</i>	—	5	DOD	
34	10/12/89 <i>Atlantis</i>	34.3° 160	5	GALILEO IMAX-02	IUS MD
33	11/19/89 <i>Discovery</i>	—	5	DOD	
32	12/18/89 <i>Columbia</i>	28.5° 190	5 10	SYNCOM IV-05 LDEF-RETR IMAX-03	Unique N/A MD
36	2/1/90 <i>Atlantis</i>	—	5	DOD	
31	3/26/90 <i>Discovery</i>	28.5° 310 - 330	5	HST IMAX-04	N/A ICBC + MD
35	4/26/90 <i>Columbia</i>	28.5° 190	7 9**	ASTRO-01 BBXRT-01	IG + 2 PALL TAPS
37	6/4/90 <i>Atlantis</i>	28.5° 243	5	GRO	Unique
38	7/9/90 <i>Discovery</i>	—	5	DOD	
40	8/16/90 <i>Columbia</i>	39.0° 160	7 8*	SLS-01	LM
41	10/5/90 <i>Atlantis</i>	28.5° 160	5	ULYSSES	IUS/PAM
39	11/1/90 <i>Discovery</i>	57.0° 140	7 8	AFP-675 IBSS	Pallet SPAS
42	12/6/90 <i>Columbia</i>	28.5° 160	7 9**	IML-01 IMAX-05	LM N/A
43	1/31/91 <i>Atlantis</i>	28.5° 160	5	TDRS-E	IUS
44	3/4/91 <i>Discovery</i>	—	5	DOD	
45	3/28/91 <i>Columbia</i>	57.0° 160	7 9**	ATLAS-01 IMAX-06	IG+2 PALL MD
46	5/16/91 <i>Atlantis</i>	28.5° 160	7	TSS-01 EURECA-1L IMAX-07	MPESS+1P EURECA-A ICBC
47	6/17/91 <i>Discovery</i>	44.0° 160	7	SPACELAB-J	LM
48	8/22/91 <i>Atlantis</i>	33.4° 175	7	STARLAB	LM+1 PALL
49	9/30/91 <i>Discovery</i>	28.5° 160	6 7	LAGEOS GEOSTAR-01	IRIS PAM-D2
50	11/27/91 <i>Atlantis</i>	57.0° 291	5	UARS	N/A
51	1/16/92 <i>Discovery</i>	28.5° 160	5 7	SPACEHAB-01 EURECA-1R	SPACEHAB EURECA-A
52	2/6/92 <i>Endeavour</i>	28.5° 160	7 9**	SL-D2	LM + USS
53	3/5/92 <i>Columbia</i>	28.5° 140	7 10***	USML-01	LM + EDO
54	4/6/92 <i>Atlantis</i>	28.5° 190	7	ASTRO-02 BBXRT-02	IG + 2 PALL TAPS
55	5/18/92 <i>Endeavour</i>	28.5° 160	5 7	PUR-1 USMP-01	MSL+MPES
56	6/15/92 <i>Columbia</i>	57.0° 145	7 9	SRL-01	PALL+MPES
57	7/9/92 <i>Atlantis</i>	57.0° 160	7	ATLAS-02	IG+1 PALL
58	8/6/92 <i>Discovery</i>	TBD	TBD	Flight Opportunity	
59	8/27/92 <i>Endeavour</i>	28.5° 160	5 7	SPACEHAB-02 SPAS-ORFEUS GEOSTAR-02	SPACEHAB ASTRO-SPA PAM-D2
60	9/30/92 <i>Columbia</i>	TBD	7 10***	SLS-02	LM+EDO
61	11/12/92 <i>Discovery</i>	28.5° 160	7	INMARSAT-01	PAM-D2
62	12/10/92 <i>Endeavour</i>	28.5° 160	5	TDRS-F	IUS

Expendables

Date	Launch Vehicle	Orbit	Launch Site	Payload
9/89	Atlas Centaur 68 R	GSO	ESMC	FLTSATCOM-F8 (Navy)
9/89	Scout	TBD	WSMC	MACSAT (Navy)
11/89	Delta 186	SS	WSMC	COBE
1/90	Atlas 50E	SS	WSMC	NOAA-D
2/90	Delta	LEO	ESMC	ROSAT
3/90	Scout	TBD	WSMC	SALT (Navy)
6/90	Atlas Centaur	GTO	ESMC	CRRES
10/90	Atlas I	GSO	ESMC	GOES-1
3/91	Scout	TBD	TBD	USAF-1 (DOD)
5/91	Atlas 34E	SS	WSMC	NOAA-1
8/91	Delta	LEO	ESMC	EUVE
11/91	Atlas I	GSO	ESMC	GOES-J
5/92	Atlas I	GSO	ESMC	GOES-K
6/92	Scout	TBD	WSMC	SAMPE
7/92	TBD	HE	ESMC	GEOTAIL
9/92	Atlas IIE	SS	WSMC	NOAA-J
9/92	Titan III	EO	ESMC	Mars Observer
12/92	TBD	HE	ESMC	WIND

Glossary

AFP	Air Force Polar Bear
ASTRO	Ultraviolet Astronomy
ATLAS	Atmospheric Laboratory for Applications and Science
BBXRT	Broad Band X-Ray Telescope
CIRRIS	Cryogenic Infrared Radiance Instrument for Shuttle
COBE	Cosmic Background Explorer
CRRES	Combined Radiation Release Experimental Satellite
DOD	Department of Defense
EDO	Extended Duration Orbiter
EO	Escape Orbit
ESMC	Eastern Space and Missile Center
EURECA	European Retrievable Carrier
EUVE	Extreme Ultraviolet Explorer
FLTSATCOM	Fleet Satellite Communication
GALILEO	Jupiter Probe
GEOTAIL	Earth Plasma Physics Geotail Explorer
GEOSTAR	Interactive Radiodetermination Satellite
GOES	Geostationary Operational Environmental Satellite
GRO	Gamma Ray Observatory
GSO	Geosynchronous Orbit
GTO	Geosynchronous Transfer Orbit
HE	High Eccentricity Orbit
HST	Hubble Space Telescope
IBSS	Infrared Background Signature Survey
ICBC	IMAX Cargo Bay Camera
IG	Igloo Environmental Control for Pallet Subsystems
IML	International Microgravity Laboratory
INMARST	International Maritime Satellite
IRIS	Italian Research Interim Stage
IUS	Inertial Upper Stage
LAGEOS	Laser Geodynamics Satellite
LDEF	Long Duration Exposure Facility
LEO	Low Earth Orbit
LM	Long Module Spacelab Crew Module
MACSAT	Multi-Access Communication Satellite (DOD)
MD	Middeck
MPES	Mission Peculiar Equipment Support Structure
MSL	Materials Science Laboratory
NOAA	National Oceanic and Atmospheric Administration
PALL	Spacelab Pallet Structure
PAM	Payload Assist Module
PUR	Payload Under Review
ROSAT	Roentgen Satellite
SALT	Special Purpose Inexpensive Satellite Altimeter
SAMPE	Solar, Anomalous, and Magnetospheric Particle Explorer
S/L	Spacelab
SLS	Space Life Sciences
SPAS	Shuttle Pallet Satellite
SS	Sun Synchronous Orbit
STARLAB	DOD Spacelab
SYNCOM	Hughes Geosynchronous Communication Satellite
TAPS	Two-Axis Pointing System
TDRS	Tracking Data Relay Satellite
TSS	Tethered Satellite System
UARS	Upper Atmosphere Research Satellite
ULYSSES	Formerly International Solar Polar Mission
USML	U.S. Microgravity Laboratory
USMP	United States Microgravity Payload
USS	Unique Support Structures
WIND	Solar Wind Measurement Satellite
WSMC	Western Space and Missile Center

*Possibility of extension to 9 days

**Possibility of extension to 10 days

***Possibility of extension to 13 days

Advanced liquid rocket engine contracts negotiated

NASA has announced the selection of three firms for negotiations on contracts to define systems for two proposed new liquid-propellant rocket engines.

The definition study efforts are part of the Space Transportation Engine Program, which could lead to development of rocket engines to meet requirements of the Department of Defense/NASA Advanced Launch System (ALS) program and other future launch system needs.

The ALS is intended to provide, by the 1998-2000 time period, a depen-

dable, reliable, high-capacity national launch capability while reducing by a factor of 10 the cost of placing payloads in Earth orbit.

Each contract is expected to be valued at approximately \$20 million and will be a 36-month effort. The firms selected for contract negotiations are Aerojet General Corp., Sacramento, Calif.; Pratt & Whitney Division of United Technologies Corp., West Palm Beach, Fla.; and Rocketdyne Division of Rockwell International, Canoga Park, Calif.

The engines to be defined for the

Space Transportation Engine Program are:

- The Space Transportation Main Engine, which would use liquid hydrogen and liquid oxygen propellants and achieve a thrust level (in vacuum) of approximately 580,000 pounds. The main engine would be used in the ALS core stage and might also be employed in a booster application; and

- The Space Transportation Booster Engine, which would use liquid methane and liquid oxygen propellants for a thrust (at sea level) of approximately 500,000 to 650,000

pounds. The booster engine is envisioned as a derivative of the main engine, rather than a unique design. A decision will be made later about whether this engine or the main engine will be used in the ALS booster stage.

The systems definition emphasis for both engines will be on use of innovative designs and approaches yielding higher reliability, lower production cost and lower operational cost compared to existing liquid propellant rockets. Both engines are to be designed for either reusable or

expendable application.

The definition study efforts will involve analyzing configuration options and associated tradeoffs and preparing preliminary designs, at the system, subsystem and component levels.

Marshall Space Flight Center will manage the three contracts, coordinating them with ongoing advanced propulsion development contracts aimed at demonstrating and providing maturity for new propulsion technologies that could be fed into the engine systems.

Apollo plan recreated

(Continued from page 1)

"The original symposium was a big, three-day event, and it was at the point in the program at which everything was coming together," Loftus said. "It was being held really for the benefit of the people presenting the papers rather than for the audience. Its purpose was to critique our various plans. We answered a lot of questions at it, but we raised a lot, too."

The recreated symposium will feature presentations including a general mission summary; communications for Apollo; mission planning; the guidance, navigation and control plans; mission constraints and software compatibility; propulsion systems; thermodynamic constraints; and structural and landing dynamics.

Among the presenters will be Ron Berry, now director of Mission Support at JSC and a participant in the original meeting. Berry was chief of the Lunar Mission Analysis Branch in the Mission Planning Division in 1966. In the July 18 symposium, he will describe the Apollo software strategy for trajectory control.

"I'll explain what trajectory functions were assigned to software, and which were onboard functions and which were done from the ground," Berry said. "I'll also describe the specific guidance targeting schemes, such as lunar orbit insertion (LOI) and the other maneuvers."

It is the same topic Berry presented at the original symposium. "It was really exciting for me at that time," Berry said. "And I think we can recreate some of that original feeling."

Chet Vaughan, chief of the Propulsion and Power Division at JSC, will give a briefing on Apollo propulsion systems. Vaughan worked on the reaction control systems for both the Lunar Module and the Command and Service Modules during Apollo. Along with his presentation, Vaughan will show a tape of a liftoff from the lunar surface and various Apollo maneuvers.

"I think coming up with the requirements for the Apollo propulsion sys-

tems was as hard as anything else to do with them," he said. "By the time the requirements were set, we had just barely started to fly Mercury. By Gemini, the hardware was fairly well designed."

Also among the presenters will be Ben Holder, former deputy chief of the Structures and Mechanics Division now a member of the technical staff of Rockwell's Engineering and Test Operations Division. During Apollo, Holder was head of the Vehicle Dynamics Section.

"I'll be talking about lunar touchdown dynamics. We did computer simulations of the lunar module to check its stability; to find out under what conditions it would topple over. We also were concerned about how the footpads would interact with the lunar surface," Holder said. "There was a lot of concern at the beginning that the surface might be too soft. We knew the Moon wasn't made of green cheese, but we weren't really sure what

it was." Information from Surveyor, which soft-landed on the surface, helped clear up the problems, he added.

Holder also will speak about the three main drivers in choosing a landing site: lighting conditions, terrain and the capability to reach a given site with the Apollo lander. "I think there's a lot of interest in Apollo now," he said. "There's a whole new generation of engineers here now, and I think they want to know how it was done."

Other speakers planned for the briefing include Owen Maynard, chief of mission operations during Apollo, who will present an overview; Dr. Charles A. Berry, former director of medical research and operations, who will discuss the medical aspects of the mission; Pete Frank, who will speak on mission planning; Ken Cox, who will speak on guidance, navigation and control; and Jerry Craig, who will give a presentation on thermal constraints encountered for Apollo.



JUNETEENTH PRESENTATION—Celebrities join JSC Black Cultural Association members and Cheryl McNair in presenting this year's Ron McNair Scholarship to Jacquelyn Johnson. The presentation was made at Monday's Juneteenth Picnic at the Gilruth Recreation Center. From left are Cleo Johnson, president of the Black United Fund, Juneteenth Chairman Robert Jenkins, Cheryl McNair, former Houston Rocket Robert Reid, Johnson, and former Houston Astro J.R. Richards.

Griggs buried with honors at Arlington

(Continued from Page 1)

Astronaut Office Chief Dan Brandenstein delivered a eulogy as part of the 25-minute service, and crew mates Bo Bobko and Jeff Hoffman served as family escorts.

The 49-year-old former Navy combat and test pilot, who joined JSC as a research pilot in 1970 and became an astronaut candidate in 1978, had been assigned to pilot the Space Shuttle *Discovery* on STS-33, a dedicated Department of Defense mission, in November.

"All of us at Johnson Space Center are deeply saddened by Dave Griggs' untimely death," said JSC Director Aaron Cohen. "He was a fine astronaut, an excellent pilot, a 'can-do' co-worker and a good friend. His services to America and its space program through NASA and the Navy were many, and they will not be forgotten.

"Just as important, he was a loving husband to his wife, Karen, and father to his daughters, Alison and Carre. On behalf of friends and co-workers here, I extend our most sincere condolences to his entire family," Cohen said.

"He was a very motivated, hard-working individual," said Astronaut Office Chief Dan Brandenstein. "He

has made numerous contributions to the program throughout his stay here. He was practically solely responsible for the heads up display, he did extensive work on orbital maneuvering vehicles and crew rescue and space station development. He was just a real hard-charging, get-the-job-done kind of individual. His dedication and talents will be sorely missed in the office."

Sen. Jake Garn, who flew with Griggs on STS-51D in April 1985, expressed his deep sorrow at the death of his "good friend."

"I spoke to Dave just two days ago," Garn said. "I could sense his excitement in preparations for his next space flight, and his unbridled enthusiasm for the space program he loved so much. He was filled with a sense of purpose and justifiable pride in the contribution he was making to the future.

"To suddenly have him gone is difficult to accept. I have lost a person who was a part of the most incredible experience of my life. NASA has lost one of its best and most promising astronauts," he said.

Griggs graduated from the U.S. Naval Academy at Annapolis, Md., in 1962 and entered pilot training shortly thereafter. He received his navy wings

in 1964, and completed one Mediterranean cruise and two southeast Asia combat cruises before entering the Navy's test pilot school in 1967. He flew various test projects on fighter and attack-type aircraft, resigning his regular Navy commission in 1970. He held the rank of Rear Admiral in the Naval Air Reserve.

After joining NASA in 1970, Griggs became project pilot for the Shuttle Trainer Aircraft and participated in their design, development and testing. He was appointed chief of the Shuttle Training Aircraft Operations Office in 1976, and selected as an astronaut candidate in 1978.

During his STS-51D flight in April 1985, Griggs and fellow Mission Specialist Jeff Hoffman made the first unscheduled space walk to attach a "fly-swatter" attachment to the remote manipulator system. Using the attachment, the crew tried unsuccessfully to flip a switch on the malfunctioning SYNCOM IV satellite.

A memorial service was held Monday night at St. Paul's Catholic Church in Nassau Bay. Memorial donations should be sent to the S. David Griggs Naval Academy Scholarship Fund in care of the Astronaut Office, Code CB.

JSC selects two companies for reusable LifeSat design

By Kari Fluegel

JSC has selected General Electric, Reentry Systems Department, and Science Applications International Corp. to continue the study and design of an unmanned, reusable reentry satellite called LifeSat (Life Science Satellite).

The two firms, headquartered in Philadelphia and Torrance, Calif., respectively, were chosen for the two parallel \$900,000 contracts. The one-year agreements are tentatively scheduled to start July 3.

The request for proposals, released in January, called for the design of a reusable spacecraft that could be processed and readied for reflight within two months, allowing for several flights each year.

The LifeSat project is managed by JSC's Flight Projects Office, New Initiatives. The satellite will be used primarily in the fields of life sciences

and materials processing.

LifeSat's life science payloads could significantly expand NASA's capability to investigate the biological effects of microgravity and the unique space radiation environment. This type of investigation can be calculated only in space, preferably in polar orbits.

The LifeSat experiments will be flown in a variety of orbits, including those providing high doses of radiation, for up to 60 days, and perhaps longer. The satellite will be placed into Earth orbit by an expendable launch vehicle, reserving the space shuttle for activities requiring crew presence.

Upon completion of the mission, LifeSat would reenter the atmosphere and soft-land at a designated ground-site, where scientists and engineers would have immediate access to the experiments.

Review team to study human resources at JSC

About a thousand JSC employees will be asked what they think about the way the center's human resources function is managed during the week of July 10.

The questionnaires completed by a randomly selected cross section of center workers will then be reviewed by a team of personnel specialists sent from Headquarters and other NASA centers. The action comes as the first step in an evaluation process held at all NASA centers every four years.

The second part, the on-site portion of the review, will be August

22-31. The review team will conduct selected interviews with employees regarding personnel management issues. These interviews are designed to build on and to further explore the information gathered in the initial questionnaire.

Any employee who is not contacted for an on-site interview and wishes participate may do so by contacting Dick Kuhn, x30616. The complete findings of the team's report will be announced as soon as the information is made available to center management.

Roundup deadlines to change temporarily

Space News Roundup will publish a special 12-page Apollo 20th Anniversary edition on July 14 in lieu of its regular four-page paper.

Because of early deadlines required to print the special edition, some regular features such as the Swap Shop and Dates and Data will not be published on July 14.

The deadline for Swap Shop ads to appear in the preceding issue on July 7, will be 5 p.m. Tuesday, June 27.

The deadline for Dates and Data

items to be published July 7 will remain 5 p.m. Wednesday, June 28.

All ads or meeting notices received after those deadlines will be held until the July 21 issue. Swap Shop ads received by July 14 will be published in the July 28 issue. Thereafter, the normal deadlines will resume: Swap Shop ads will be due two weeks before the desired date of publication and Dates and Data items will be due eight working days before the desired date of publication.

Space News Roundup

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Swap Shop deadline is every Friday, two weeks before the desired date of publication.

Editor Kelly Humphries
Associate Editor Linda Copley

Honor awards correction

The winners of several of the top 1989 JSC Honor Awards were omitted from the Space News Roundup on June 16.

Robert Minor was awarded a Distinguished Public Service Medal; Carolyn Huntoon and Chester Vaughan, each received an Outstanding Leadership Medal; Donald Kessler received the Exceptional Scientific Achievement Medal; and Gregory Hayes was awarded the Equal Opportunity Medal.

The awards were presented during ceremonies in Teague Auditorium, June 14.